LAWRENCE LIVERMORE
REPORT

A weekly review of scientific and technological achievements from Lawrence Livermore National Laboratory, June 6- 10, 2011

It's elemental

In 1990, Livermore's Ken Moody (left) and Ron Lougheed (center) joined academician Yuri Oganessian (right), head of the Flerov Laboratory of Nuclear Reactions in Dubna, Russia, in a toast to the beginning of what became a 21-year collaboration to create superheavy elements.

Ten years after Laboratory scientists and Russian collaborators discovered elements 114 and 116, they finally have their day in the sun by deciding what to name them.

Elements 114 and 116 (numbers that refer to the number of protons in their nuclei and which give them their unique boxes on the table) have received official status by the International Union of Pure and Applied Chemistry.

That official status gives the scientists who discovered them the right to name the elements. The elements only last for a millisecond by slamming two lighter elements together in hopes that they stick, and in the case of 114 and 116, they did.

To read more, go to the Web.

This is your brain with a larger helmet

LLNL mechanical engineer Mike King (left) and physicist Willy Moss watch a compression test of a helmet pad.

While traumatic brain injury in many troops has been classed as mild or a concussion, doctors warn that these injuries may be more damaging than originally thought.

That's where Livermore researchers Willy Moss and Mike King come in. According to their study, King and Moss found that troops could be protected from such traumatic brain injury by wearing a larger helmet.

In fact, the research demonstrated that giving troops a larger helmet with more padding could reduce impact to the skull by 24 percent.

To read more, go to the Web.

NIFtastic voyage

Inside the NIF target chamber.

Fusion might just push us to the stars sooner than we think.

The real Holy Grail for an interstellar mission will be breakthroughs in our ability to harness thermonuclear energy – fusion, the same energy that powers the stars.

At the National Ignition Facility, scientists are moving closer to creating a star on earth.

To read more, go to the Web.

Clustering the data

The Advanced Simulation and Computing program at the Laboratory will receive new "capacity" computing resources under a contract announced by the National Nuclear Security Administration (NNSA) this week.

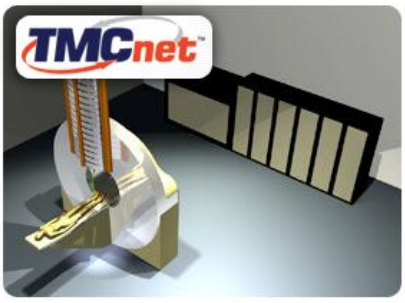
Under the terms of the contract, computing clusters built of "scalable units" (SUs) will be delivered to each of the laboratories between September 2011 and June 2012. "Capacity" computing systems are designed to run a large number of jobs simultaneously on a single system.

The new computers are part of a tri-lab procurement that also will benefit stockpile stewardship work at Sandia and Los Alamos national labs. The contract was awarded to Appro, a leading developer of high-performance Linux cluster computing systems based in Milpitas. LLNL led the tri-lab computing cluster (TLCC) procurement for NNSA.

The new clusters will support NNSA's Life Extension Program and investigations into technical issues related to aging weapons systems.

To read more, go to the Web.

Protons to treat cancer



Artist's rendition of a possible proton therapy system.

The Lab's proton therapy technology, which can precisely deliver radiation to a tumor without damaging healthy tissues, is getting closer to being in a hospital near you.

Compact Particle Acceleration Corporation (CPAC), which licensed the technology from the Laboratory, has completed the construction of the first Dielectric Wall Accelerator (DWA) pre-commercial prototype system.

It's another step toward the development of the first commercial DWA. It will be the world's most precise and compact accelerator for use in proton therapy systems, and has the potential to advance the boundaries of cancer care.

Radiation therapy has been used in the treatment of cancer for many years, but most of the treatments have been done with X-rays, which are successful in destroying many tumors but can damage healthy tissue around the tumor. Proton therapy beams energy precisely to the tumor without seriously harming surrounding tissues or critical organs.

To read more, go to the Web.

LLNL applies and advances science and technology to help ensure national security and global stability. Through multi-disciplinary research and development, with particular expertise in high-energy-density physics, laser science, high-performance computing and science/engineering at the nanometer/subpicosecond scale, LLNL innovations improve security, meet energy and environmental needs and strengthen U.S. economic competitiveness. The Laboratory also partners with other research institutions, universities and industry to bring the full weight of the nation's science and technology community to bear on solving problems of national importance.

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